

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/790,060	WATANABE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Samuel W. Liu	1653	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/11/06.
2. ☒ The allowed claim(s) is/are 1-3 and 5-9.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</li> <li>6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> <li>7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____</li> </ol> |
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### DETAILED ACTION

The amendment filed 1/11/06, which amended claims 1-3, 5-9, and cancels claim 4, has been entered. Pending claims 1-3 and 5-9 are examined in this Office action.

### EXAMINER'S AMENDMENT

An Examiner's Amendment to the record appears below. Should the change and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 C.F.R. § 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than payment of the Issue Fee.

Authorization for this Examiner's Amendment was given in a telephone interview with Jacob A. Doughty on February 8, 2006. Applicants agree the Examiner proposed amendment to claims 1 and 5 (see below).

#### Amendments to the claim:

The pending claims 1 and 5 have been amended as follows. Please replace the previous claim with the claims shown below.

Claim 1 (*Amended*): A metal complex-protein composite, comprising an apoprotein having a cavity and a metal complex, wherein[:]the apoprotein is selected from the group consisting of apomyoglobin, apohemoglobin, apoheme oxygenase, apocatalase, apoferritin, and their variants; the metal complex is prepared by complexation of a metal ion with a ligand; the metal ion is selected from the group consisting of rhodium, ruthenium and palladium; the metal complex-protein composite has a structure such that the metal complex is received in the cavity of the apoprotein; the metal complex is selected such that the metal complex does not cause degradation or instability of the apoprotein; and amino acid residues of the apoprotein coordinate with the metal complex.

Claim 5 (*Amended*): The metal complex-protein composite of claim [4] 1, wherein:

The apoprotein is a variant of an apomyoglobin; and a histidine hydrogen bonded to oxygen and combined with iron in myoglobin is replaced in the variant.

**Amendments to the specification:**

Insert the following paragraph before the "Description" paragraph:

This application claims foreign priority benefit of the filing date under 35 U.S.C. 119 of Japan application 2003-310085, filed 9/2/2003.

On page 9, "Fig. 2 shows..." should be changed to "Fig. 2(a) to 2(d) show ...".

Abstract is amended as follows (in one paragraph):

A metal complex-protein composite comprising apohemoglobin, apoheme oxygenase, apocatalase or apoferitin having cavity and a metal complex has a specific structure that the metal complex is received in the cavity of the apoprotein. The metal complex is prepared by complexation of a metal ion, which is selected from the group consisting of rhodium, ruthenium, and palladium, with a ligand. The metal complex-protein composite functions as a hydrogenation catalyst of an olefin in water. The metal complex-protein composite is thus effectively applied to hydrogenation of water-soluble substrates and has environmental advantages over organic solvents.

*Conclusion:* 1-3 and 5-9 are allowed.

The following is an **Examiner's Statement of Reasons for Allowance:** the amended claim 1 (in the amendment filed 1/11/06), which recites that the apoprotein in the metal complex-protein composite is an apoprotein, i.e., apohemoglobin, apoheme oxygenase, apocatalase or apoferitin, obviates the rejection under 35 USC 102 and 103 by Jackson et al. reference. Also, the amended claim 1, which incorporates the limitation that the metal complex is selected such that the metal complex does not cause degradation or instability of the apoprotein and amino acid residues of the apoprotein coordinate with the metal complex thereof, overcomes the rejection under 35 USC 112, first paragraph. Thus, claims 1-3 and 5-9 are allowable over the art of record.

Any comments considered necessary by applicants must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

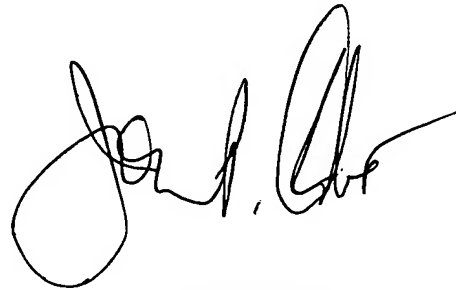
Art Unit: 1653

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Wei Liu, Ph.D. whose telephone number is (571) 272-0949. The Examiner can normally be reached daily except alternate Fridays from 8:30 A.M. to 5:30 P.M. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Jon Weber, can be reached at (571) 272-0925. The official fax number for Technology Center 1600 is (703) 308-4242. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 1600 receptionist whose telephone number is (703) 308-0196.



Samuel W. Liu, Ph.D.  
Art Unit 1653, Examiner  
February 17, 2006



**JON WEBER**  
**SUPERVISORY PATENT EXAMINER**

### **Abstract**

A metal complex-protein composite comprising apohemoglobin, apoheme oxygenase, apocatalase or apoferrin having cavity and a metal complex has a specific structure that the metal complex is received in the cavity of the apoprotein. The metal complex is prepared by complexation of a metal ion, which is selected from the group consisting of rhodium, ruthenium, and palladium, with a ligand. The metal complex-protein composite functions as a hydrogenation catalyst of an olefin in water. The metal complex-protein composite is thus effectively applied to hydrogenation of water-soluble substrates and has environmental advantages over organic solvents.